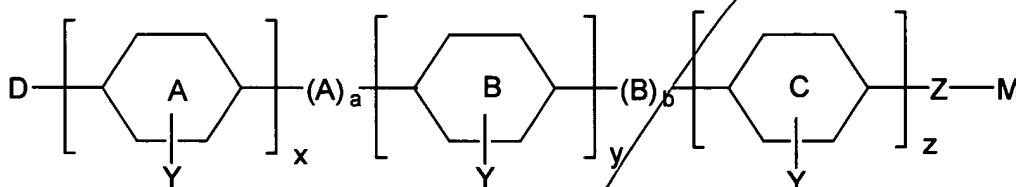


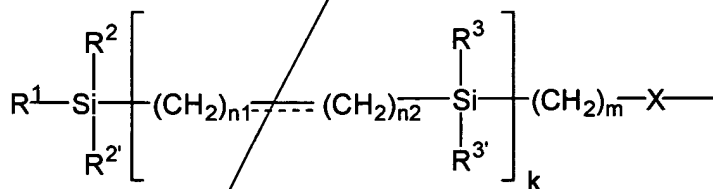
We claim:

SUP
B1

1. A liquid crystal composition comprising one or more compounds of formula:



where D is:



where:

R^1 is an alkyl or alkenyl group having j carbon atoms and R^2 , $R^{2'}$, R^3 and $R^{3'}$, independently of one another, are alkyl groups having from 1-6 carbon atoms;

$n1$ and m are integers from 1 to about 20;

$n2$ can be zero or an integer from 1 to 20 where the dashed line indicates a possible double or triple bond;

k is 0 or an integer from 1 to 10; and

X is oxygen or a single bond;

and

wherein a , b , x , y , z can be 0 or 1; $x + y + z$ is 1, 2 or 3, when x is 0, a is 0; when z is 0, b is 0;

A and B , independently, when present, can be $-O-$, $-COO-$, $-OOC-$, $-CH_2-CH_2-$, $-CH=CH-$, $-C \equiv C-$, $-CH=CH-CH=CH-$, $-O-CH_2-$ or $-CH_2-O$;

the A, B and C rings, independently of one another, are aromatic rings or alicyclic rings, where one or two carbons in the A, B or C rings that are aromatic can be replaced with a N, O or S and one or two of the carbons in the A, B or C rings that are alicyclic can be replaced with a N, O or S or a C=O group;

Y can represent up to four substituents on aromatic rings and up to 10 substituents on an alicyclic ring where Y can a halogen, CN group, NO₂, alkyl or alkoxy;

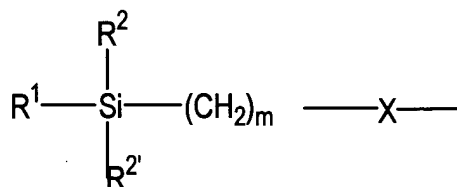
Z is a single bond, an -O- or a -COO- or -OOC- group, and

M is a tail group which can be:

a non-fluorinated alkyl, or ether group or R^F,

where R^F is an alkyl, or ether group which is fully or partially fluorinated.

2. The LC composition of claim 1 wherein D is:

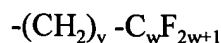


3. The LC composition of claim 2 wherein R¹, R², and R^{2'} are methyl groups and m is an integer ranging from 2 to 20, inclusive.
4. The LC composition of claim 3 wherein X is O.
5. The LC composition of claim 4 wherein M is R^F.
6. The LC composition of claim 5 wherein R^F is:



where h is 0 or an integer ranging from 1 to 10, inclusive, p, q, r, s, t, u, v, and w are 0 or integers ranging from 1 to about 20, inclusive and where $p + q + r + s + h(t + u)$ equal to about 20, inclusive.

7. The LC composition of claim 6 wherein R^F is:



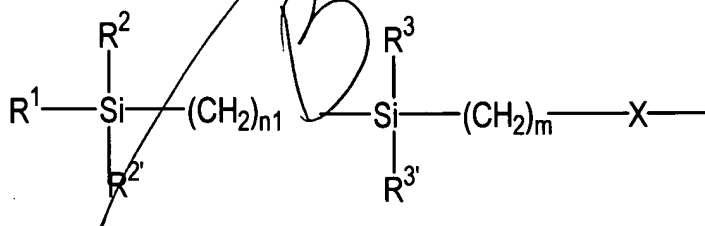
where v and w are integers ranging from 1 to 20, inclusive, and v + w is 5 to 20, inclusive.

8. The LC composition of claim 6 wherein the core is a phenylpyrimidine.

9. The LC composition of claim 6 wherein the core is an optionally substituted terphenyl group.

10. The LC composition of claim 9 wherein the core is substituted with one or two fluorines.

11. The LC composition of claim 1 wherein D is:



12. The LC composition of claim 11 wherein R^1 , R^2 , $R^{2'}$, R^3 and $R^{3'}$ are methyl groups, m is an integer ranging from 2 to 20, inclusive, and n1 is an integer ranging from 1 to 5 inclusive.

13. The LC composition of claim 12 wherein X is O.

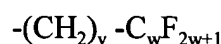
14. The LC composition of claim 13 wherein M is R^F.

15. The LC composition of claim 14 wherein R^F is:



where h is 0 or an integer ranging from 1 to 10, inclusive, p, q, r, s, t, u, v, and w are 0 or integers ranging from 1 to about 20, inclusive and where $p + q + r + s + h(t + u)$ equal to about 20, inclusive.

16. The LC composition of claim 14 wherein R^F is:



where v and w are integers ranging from 1 to 20, inclusive, and v + w is 5 to 20, inclusive.

17. The LC composition of claim 14 wherein the core is a phenylpyrimidine.

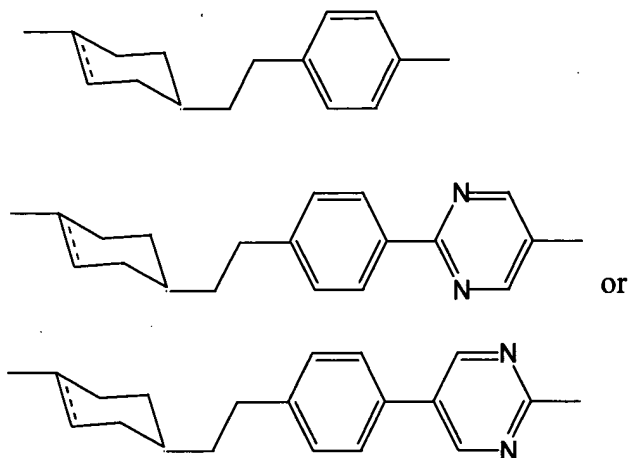
18. The LC composition of claim 14 wherein the core is an optionally substituted terphenyl group.

19. The LC composition of claim 18 wherein the core is substituted with one or two fluorines.

20. The LC composition of claim 1 wherein the core is phenylpyrimidine.

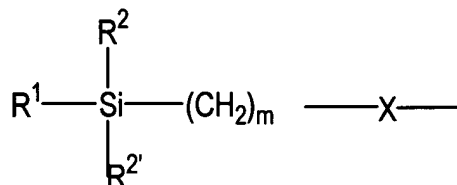
21. The LC composition of claim 1 wherein the core is optionally substituted terphenyl.

22. The LC composition of claim 1 wherein the core is:

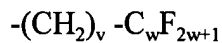


23. The LC composition of claim 22 wherein M is R^F .

24. The LC composition of claim 23 wherein D is:

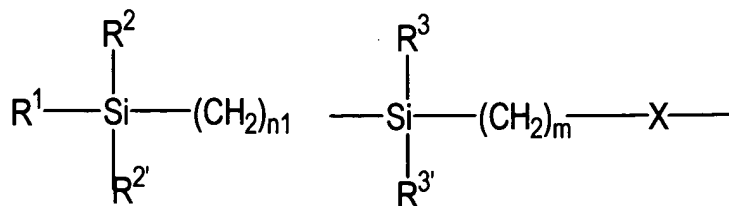


25. The LC composition of claim 24 wherein R^F is:

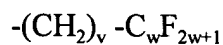


where v and w are integers ranging from 1 to 20, inclusive, and v + w is 5 to 20, inclusive.

26. The LC composition of claim 23 wherein D is:



27. The LC composition of claim 26 wherein R^F is:



where v and w are integers ranging from 1 to 20, inclusive, and v + w is 5 to 20, inclusive.

✓ 28. The LC composition of claim 1 which exhibits a smectic C phase.

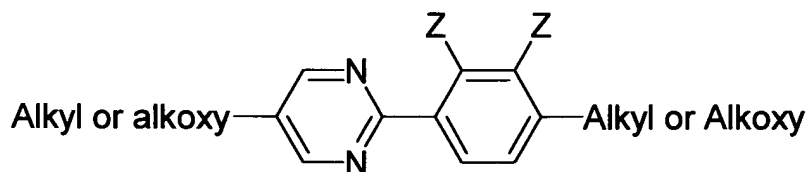
✓ 29. The LC composition of claim 28 which exhibits a smectic A phase.

✓ 30. The LC composition of claim 29 which exhibits a nematic phase.

✓ 31. The LC composition of claim 1 which has a freezing point less than or equal to -60°C.

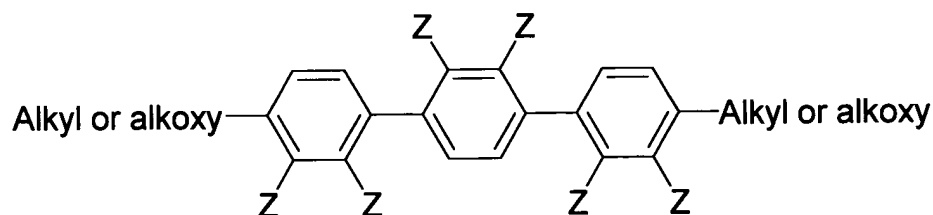
✓ 32. The LC composition of claim 1 which has a freezing point which is 10 °C or more lower than its melting point.

✗ 33. The LC composition of claim 1 further comprising one or more compounds of formula:



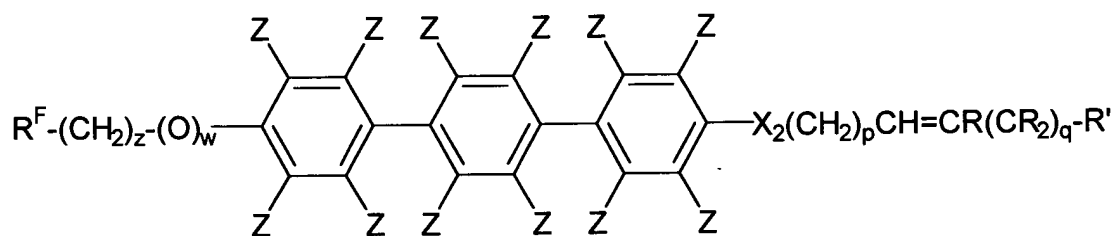
where Z is H or F.

34. The LC composition of claim 33 further comprising one or more compounds of formula:

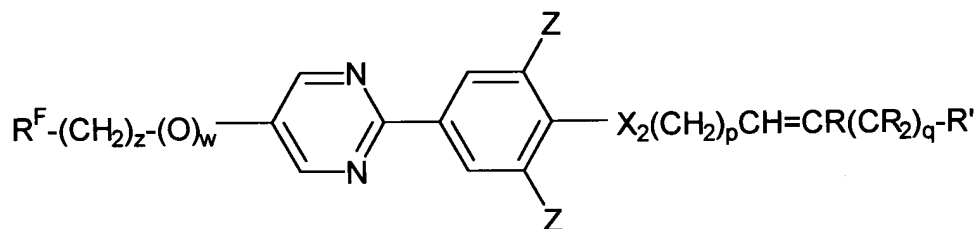


where Z is H or F.

35. The LC composition of claim 34 further comprising one or more compounds of formulas:

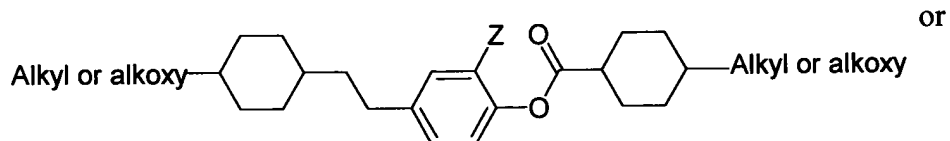
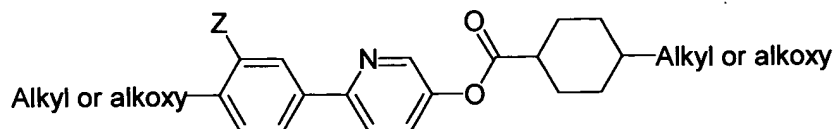
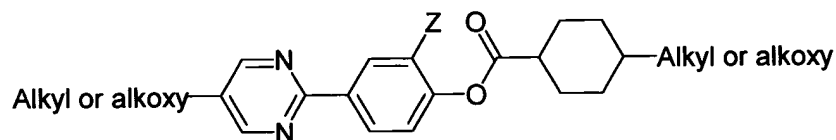


or



where p, x and z are integers ranging from 1 to 20, inclusive, q is 0 or an integer ranging from 1 to 20, inclusive ; w is 0 or 1; R are alkyl groups, preferably having from 1 to 6 carbon atoms; R' is an alkyl group having from 5 to 20 carbon atoms; R^F is a perfluoroalkyl group; Z is H or a F; and alkyl or alkoxy groups are those that have 5 to 20 carbon atoms.

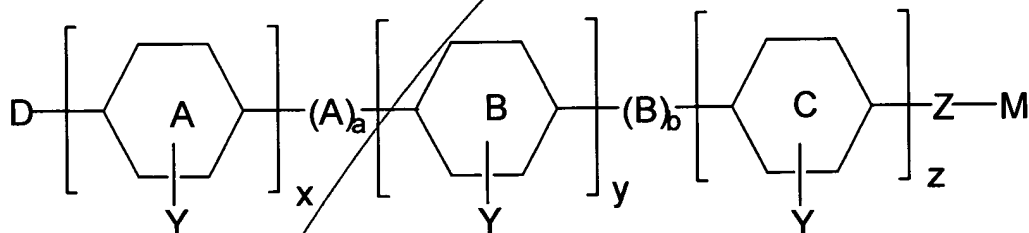
36. The LC composition of claim 1 further comprising one or more compounds of formulas:



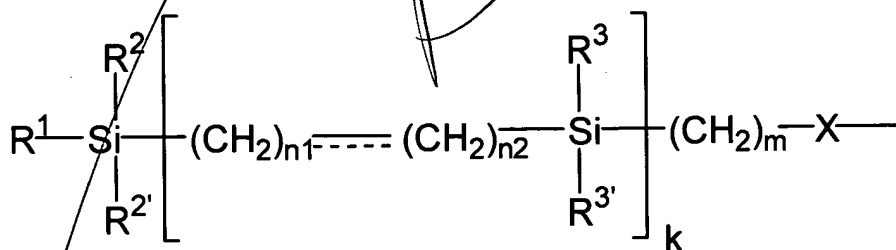
or

where Z is H or F.

37. A LC compound having the formula:



where D is:



where:

R^1 is an alkyl or alkenyl group having j carbon atoms and R^2 , $R^{2'}$, R^3 and $R^{3'}$, independently of one another, are alkyl groups having from 1-6 carbon atoms;

n_1 and m are integers from 1 to about 20;

n_2 can be zero or an integer from 1 to 20 where the dashed line indicates a possible double or triple bond;

k is 0 or an integer from 1 to 10; and

X is oxygen or a single bond;

and

wherein a, b, x, y, z can be 0 or 1 ; $x + y + z$ is 1, 2 or 3, when x is 0, a is 0; when z is 0, b is 0;

A and B , independently, when present, can be $-O-$, $-COO-$, $-OOC-$, $-CH_2-CH_2-$, $-CH=CH-$, $-C\equiv C-$, $-CH=CH-CH=CH-$, $-O-CH_2-$ or $-CH_2-O$;

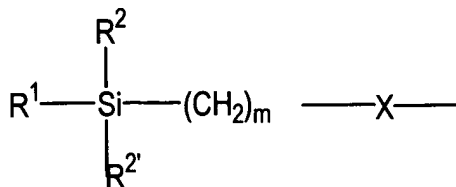
the A, B and C rings, independently of one another, are aromatic rings or alicyclic rings, where one or two carbons in the A, B or C rings that are aromatic can be replaced with a N, O or S and one or two of the carbons in the A, B or C rings that are alicyclic can be replaced with a N, O or S or a $C=O$ group;

Y can represent up to four substituents on aromatic rings and up to 10 substituents on an alicyclic ring where Y can a halogen, CN group, NO_2 , alkyl or alkoxy;

Z is a single bond, an $-O-$ or a $-COO-$ or $-OOC-$ group, and

M is R^F .

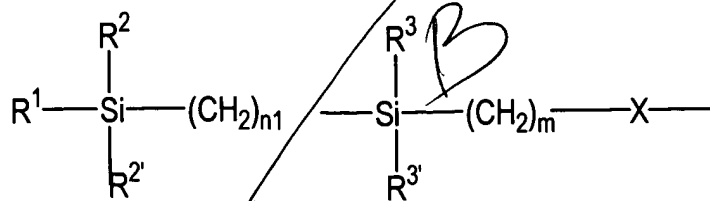
38. The LC compound of claim 37 wherein D is:



543
155

39.

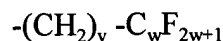
The LC compound of claim 37 wherein D is:



40. The LC compound of claim 39 wherein $n1$ is 1.

41.

The LC compound of claim 37 where R^F is :



where v and w are integers ranging from 1 to 20, inclusive, and $v + w$ is 5 to 20, inclusive.

42.

The LC compound of claim 37 wherein the core is a phenylpyridine.

43.

The LC compound of claim 1 wherein the core is a terphenyl.

44.

An optical device which comprises an aligned layer of an LC composition of claim 1.

45.

The device of claim 44 wherein the device is an SSFLC device.